

## **SECTION II** **REMARKS**

### **Regarding the Amendments**

Claims 1, 7, 15, 22 and 30 have been amended as set forth in the above Complete Listing of the Claims. As amended, the claims are supported by the specification and the original claims. No new matter has been added, as defined by 35 U.S.C. § 132.

Specifically, the claims have been amended to clarify that the CNT structure recited therein is composed of CNT layers attached directly to the substrate and attached directly to one another, without use of chemical anchors. Support for such is found in the specification, in the preferred embodiment description of the invention, as set forth in the Examples.

Thus, upon entry of the amendments, claims 1-5 and 7-31 will be pending, of which claims 1-5, 12, 14-21, 27 and 29 are withdrawn.

### **Rejection of Claims 7-11, 22-26, 30 and 31 Under 35 U.S.C. §103**

The examiner has maintained the rejection of claims 7-11, 22-26, 30 and 31 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,872,681 (hereinafter “Niu et al.”) in view of Mamedov et al., Nature Materials 1:190-194, 2002 (hereinafter “Mamedov et al.”). By the present Office Action, the examiner has also rejected claims 13 and 28 under 35 U.S.C. §103(a) as being unpatentable over Niu et al. in view of Mamedov et al. Applicants respectfully disagree.

As pending, independent claims 7 and 22 each recite in step (a):

“reacting a substrate having amine groups exposed on the surface or a substrate having amine groups exposed in a pattern with CNT having exposed carboxyl groups to form a CNT single layer or single layer pattern on the surface of the substrate by amidation reaction between the amine groups and the carboxyl groups (emphasis added).”

As such, the claims recite a step where the CNT is bound directly to the substrate to form a CNT single layer on the surface of the substrate. Such direct binding is also described in the specification of the present application at page 13, lines 1-4:

“[t]he CNT having exposed carboxyl groups, prepared in Example 1, was reacted with the substrate having exposed amine groups, prepared in Example 2 to form a CNT single layer on the



suggests to one of ordinary skill in the art.” *Application of Wesslau*, 353 F.2d 238, 241 (C.C.P.A. 1965); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve*, 796 F.2d 443, 448 (Fed. Cir. 1986), cert. denied, 484 U.S. 823 (1987).

In *KSR International Co. v. Teleflex Inc.*, No. 04-1350, 550 U.S. \_\_\_\_ (April 30, 2007), the Supreme Court further confirmed that references that teach away from the invention are evidence of the non-obviousness of a claimed invention, (*KSR*, slip op. at pp. 20-23) and reaffirmed the principle that a fact finder judging patentability “should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.”

The cited Niu et al. reference describes carboxylated CNTs. However, Niu et al. does not describe formation of CNT layered structures on a substrate. Niu et al. viewed in light of Mamedov et al. does not remedy the above deficiencies.

Mamedov et al. provides a SWNT assembly containing a PEI/PAA layer between the substrate and the first layer of CNT. Such an assembly teaches away from the presently claimed CNT film or pattern where the CNT is bound directly to the substrate. Even where Niu et al. Niu et al. in view of Mamedov et al. therefore does not provide all elements of the claimed invention and therefore the claims of the invention are not obvious in view of the cited references.

Additionally, the examiner alleges that the recitation of the transitional phrase “consisting essentially of” in independent claims 7 and 22 is not effective to limit the claims to the “basic and novel characteristics” of the invention as such characteristics are not clearly indicated in the specification or claims. Applicants respectfully disagree and allege that by the disclosure of the specification and claims it is clear that CNT films, patterns or biochips of the invention contain the basic and novel characteristics of CNTs bound directly to the substrate without intervening chemical anchors and CNT layers bound directly to other CNT layers without intervening chemical anchors.

In the examples section of the application, a preferred embodiment is provided in Examples 1-3, wherein the CNT film is assembled by reaction of a carboxylated CNT (Example 1) with a substrate with exposed amine groups (Example 2) that react by amide bond formation between the two “to form a CNT single layer on the substrate.” (Specification, page 13.) Next “another CNT layer by the formation of amide bond” was performed. Such sequential CNT layer



no basis of *prima facie* obviousness of the claimed invention is presented by such cited references.

With regard to pending and independent claims 7, 22 and 30, Niu et al. in light of Mamedov et al. do not describe a CNT film, pattern, biochip or multilayer structure consisting essentially of layers of CNT. The present invention, by modification of the exposed carboxyl groups directly on a CNT to amines and binding to a subsequent carboxylated CNT, eliminates the need for such linearity improvement and "chemical anchors" and thus provides an improvement over a layered composition as provided by Niu et al. in light of Mamedov et al.

Since Niu et al. in light of Mamedov et al. does not provide any logical basis for the CNTs recited in claims 7-11, 13, 22-26, 28, 30 and 31, Niu et al. in light of Mamedov et al. does not render the claimed invention obvious. Accordingly, withdrawal of the rejection of claims 7-11, 13, 22-26, 28, 30 and 31 under 35 U.S.C. § 103 (a) as being obvious over Niu et al. in light of Mamedov et al. is respectfully requested.

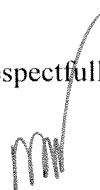
### CONCLUSION

Based on the foregoing, all of Applicants' pending claims 7-11, 13, 22-26, 28, 30 and 31 are patentably distinguished over the art, and are in form and condition for allowance. The Examiner is requested to favorably consider the foregoing and to responsively issue a Notice of Allowance.

No fees are believed to be due for the filing of this paper. However, should any fees be required or an overpayment of fees made, please debit or credit our Deposit Account No. 08-3284, as necessary.

If any issues require further resolution, the Examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same.

Respectfully submitted,

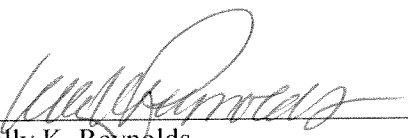


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*April 11, 2008*

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re United States Patent Application of:	Docket No.:	4240-104
Applicants: JUNG, Hee Tae, et al.	Conf. No.:	9621
Application No.: 10/805,044	Art Unit:	1639
Date Filed: March 19, 2004	Examiner:	Christopher M. Gross
Title: METHOD FOR FABRICATING A BIOCHIP USING THE HIGH DENSITY CARBON NANOTUBE FILM OR PATTERN	Customer No.:	23448

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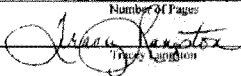
**ATTN: Examiner Christopher M. Gross**

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IN U.S. PATENT APPLICATION NO. 10/805,044**

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	)	<b>Examiner:</b>	<b>Christopher M. Gross</b>
<b>Date Filed:</b>	)		
<b>March 19, 2004</b>	)		
	)	<b>Customer No.:</b>	
<b>Title:</b>	)		
<b>METHOD FOR</b>	)		
<b>FABRICATING A BIOCHIP</b>	)		
<b>USING THE HIGH DENSITY</b>	)		
<b>CARBON NANOTUBE FILM</b>	)		
<b>OR PATTERN</b>	)		
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